



Apr 5th, 1:45 PM - 2:00 PM

Spatio-temporal variation in the nearshore forage fish community in the Strait of Juan de Fuca

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Speaker

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Elwha River dam removals

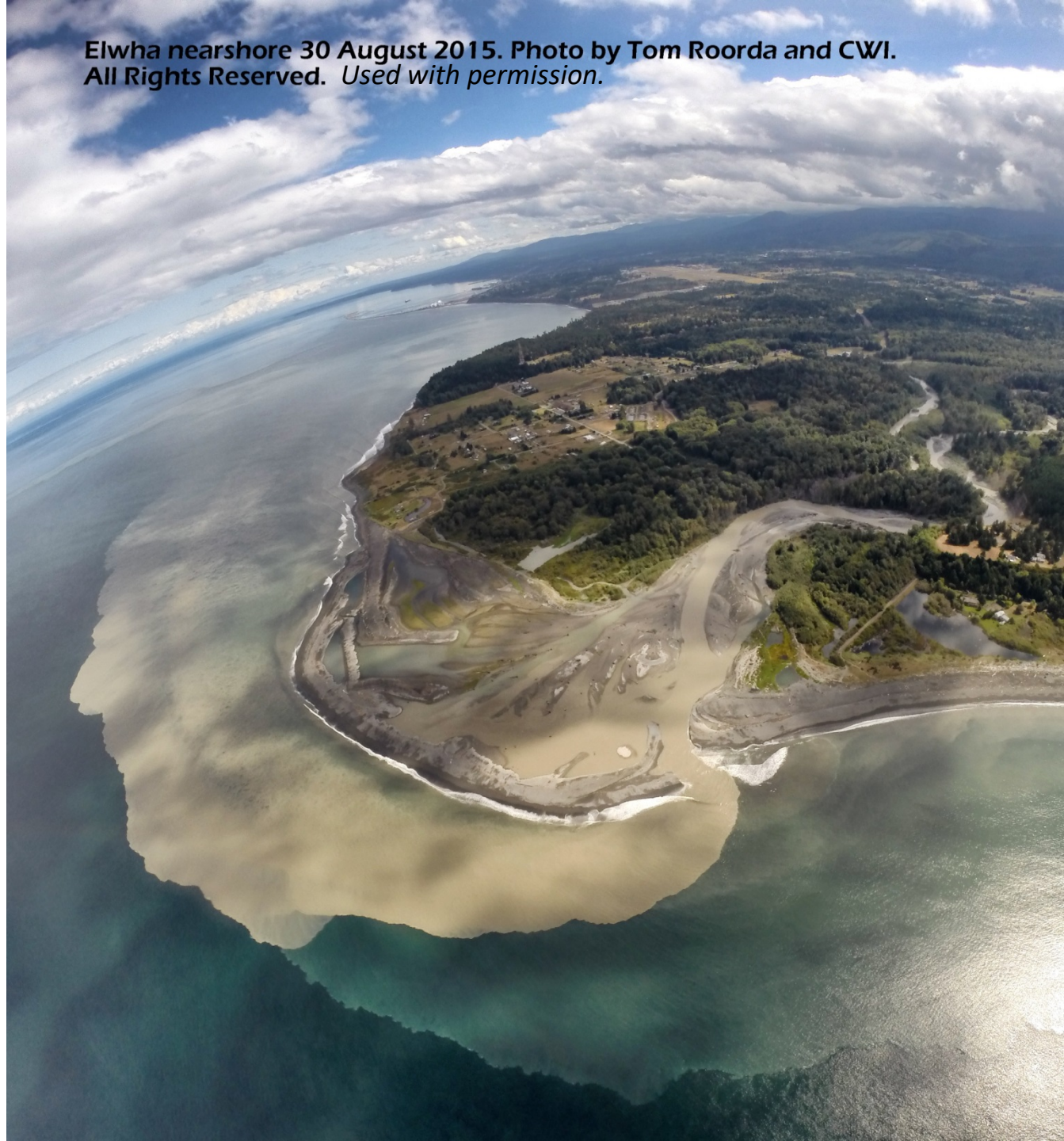


Elwha nearshore 30 August 2015. Photo by Tom Roorda and CWI.
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Goals

Assess monthly, inter-annual, and spatial variability in forage fish abundance and community composition.

Examine the effects of habitat change on nearshore fish following removal of the Elwha River dams.

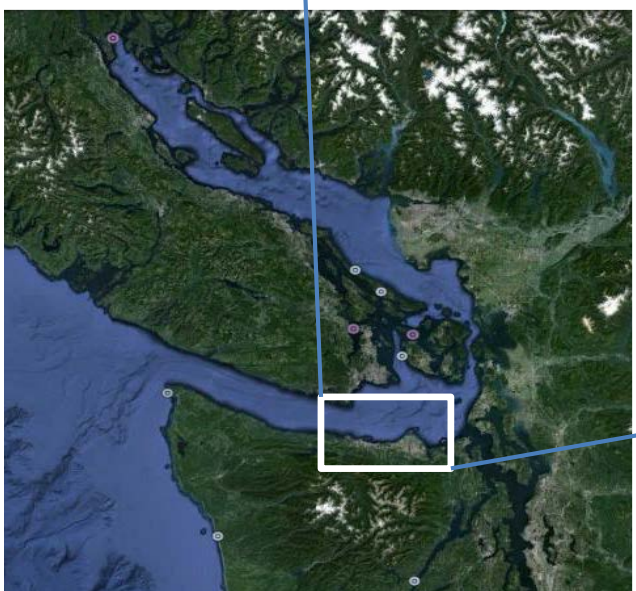
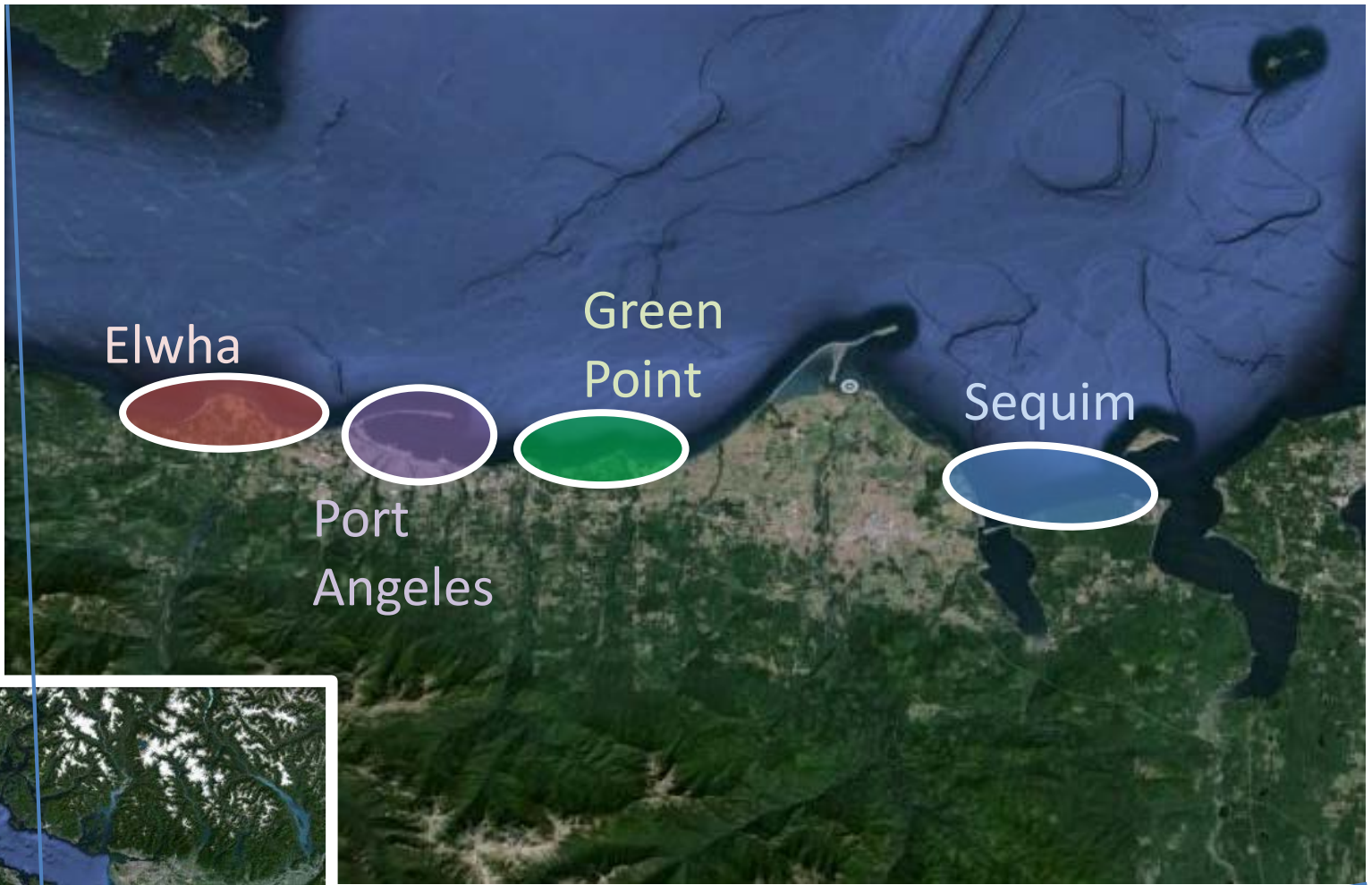


Methods



Beach seine at 23 sites April – September (6 months)

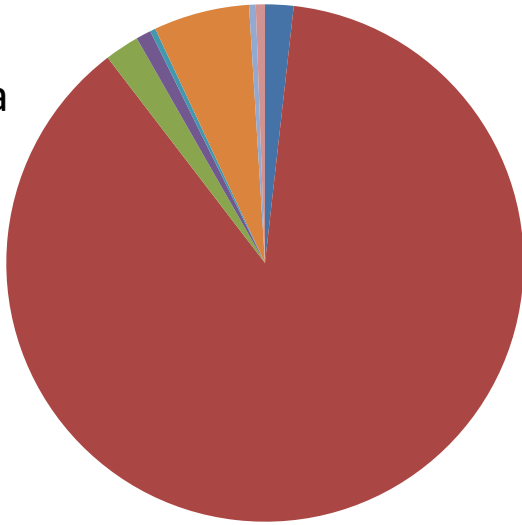
Identify and count all fish, measure 20 of each species



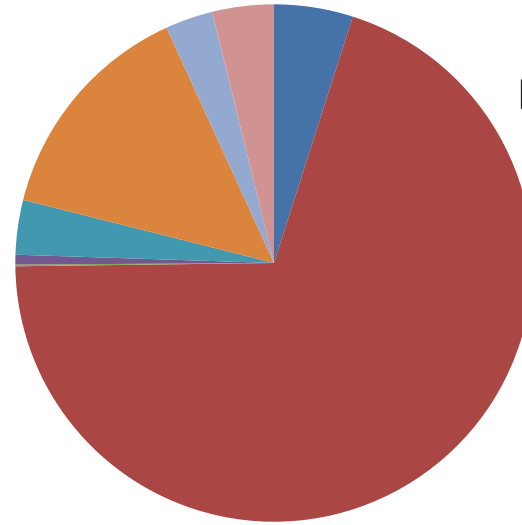
Sampling Area	# of monthly sets
Elwha	5
Port Angeles	6
Green Point	4
Sequim	8

Forage Fish dominate

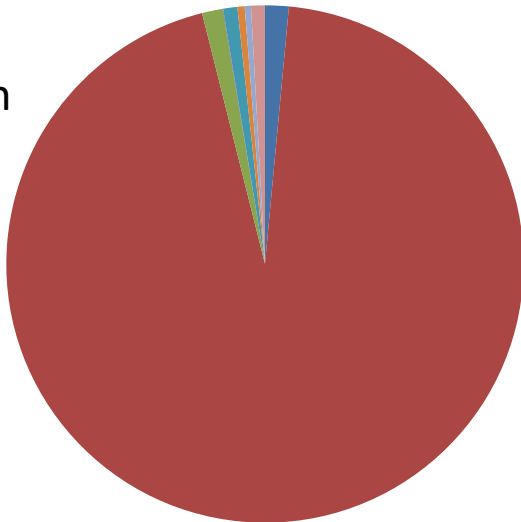
Elwha



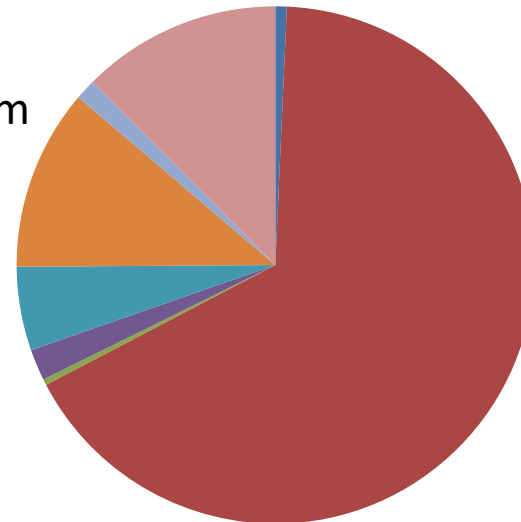
Port Angeles



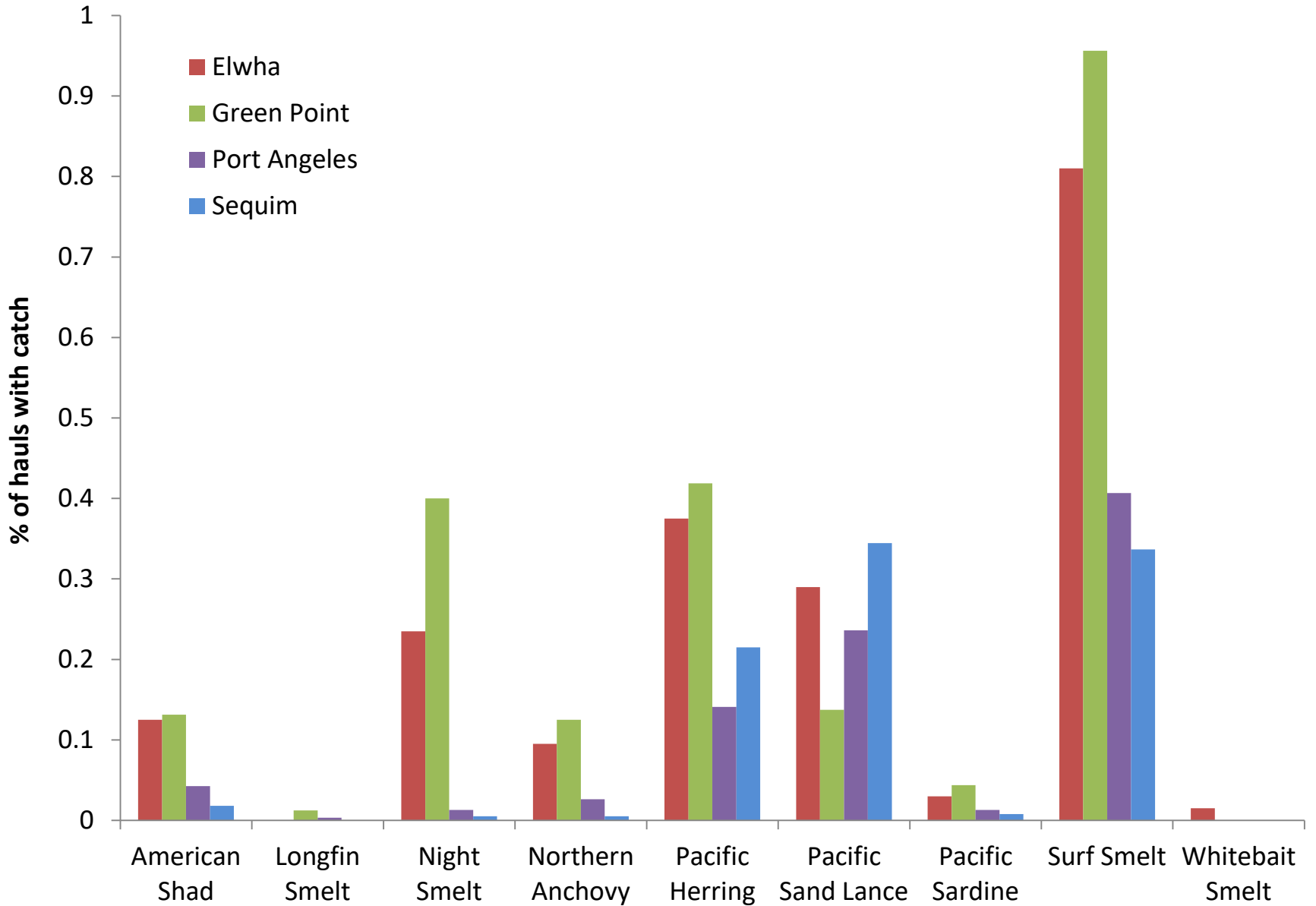
Green Point

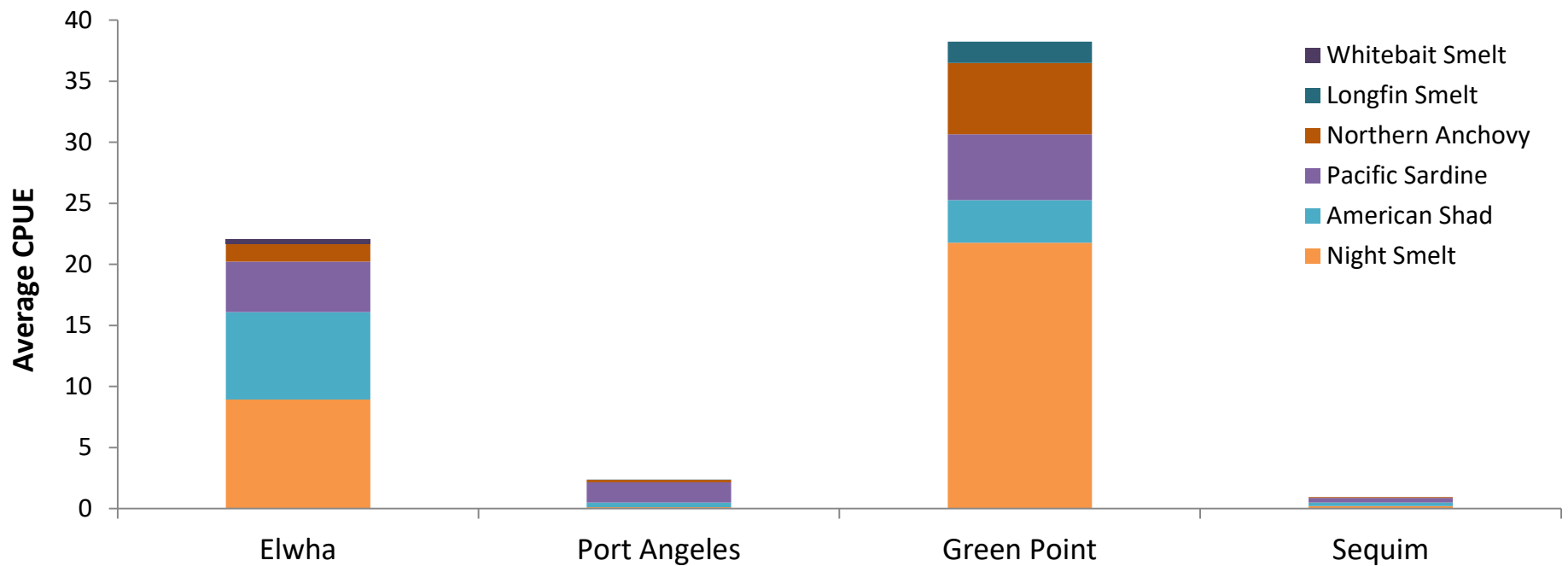
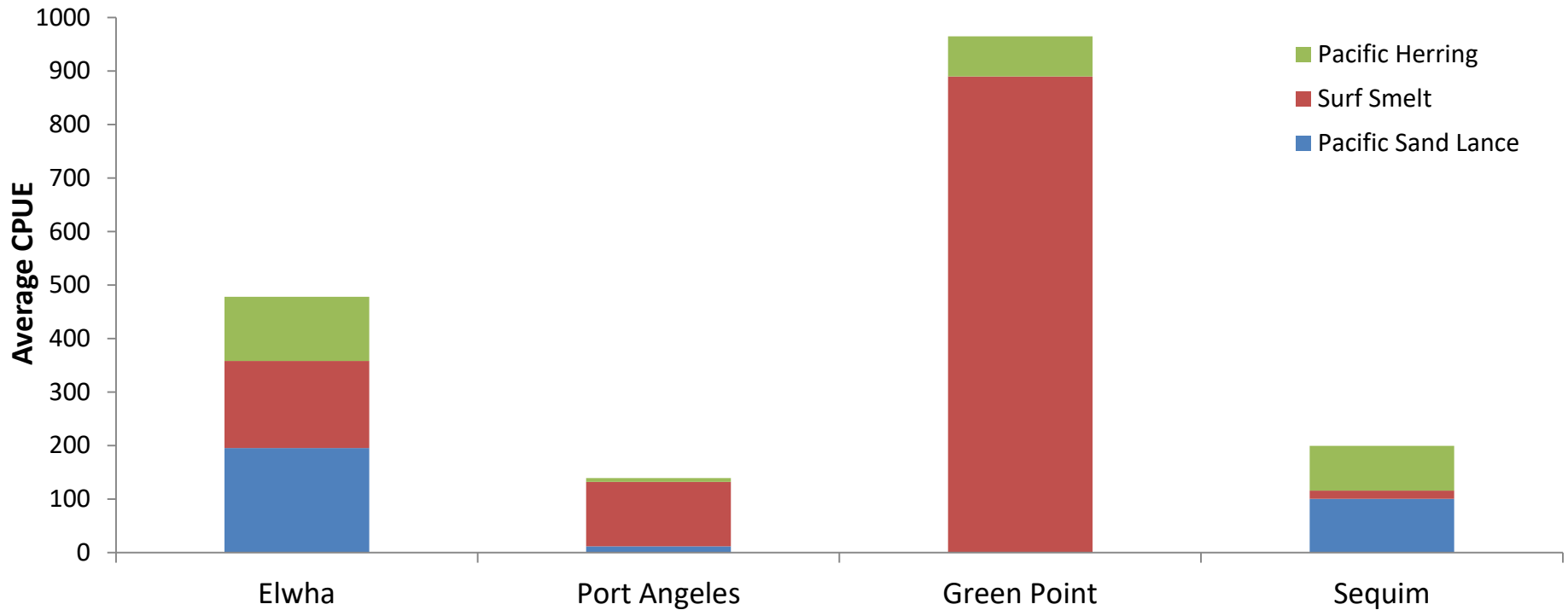


Sequim



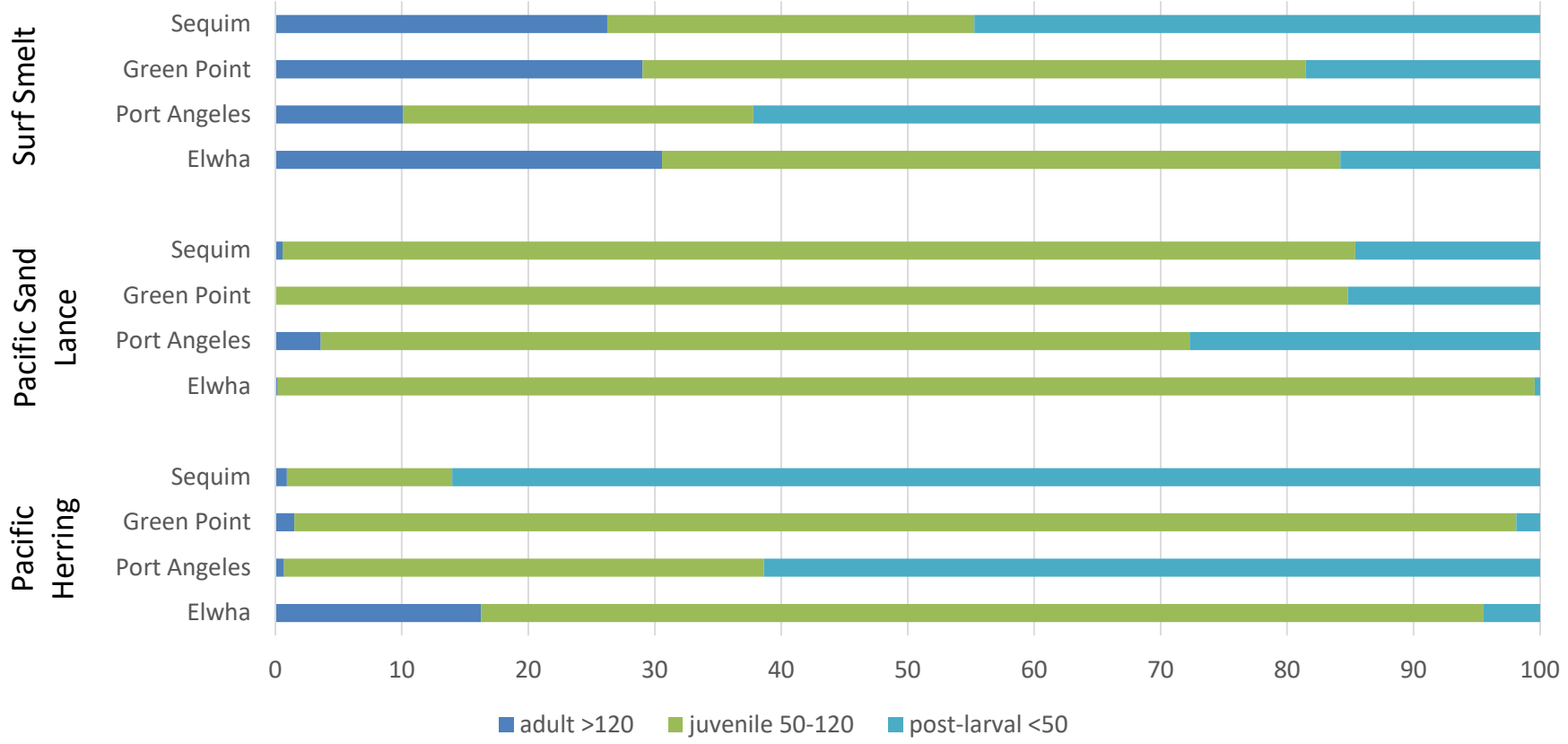
- flatfish
- forage_fish
- gadids
- greenling
- other
- salmonids
- sculpins
- surfperches



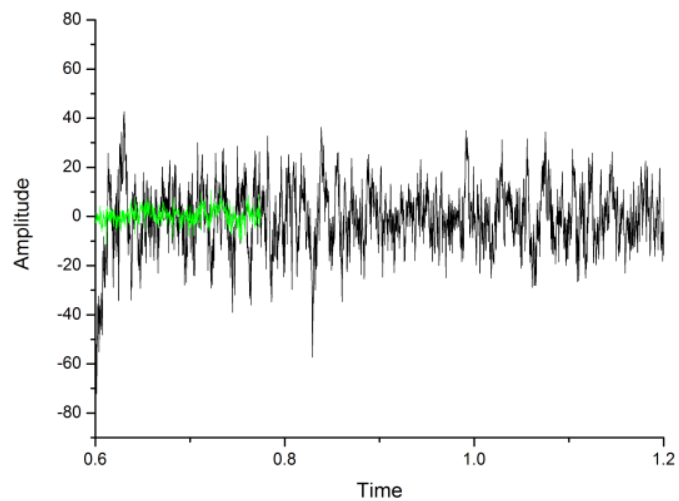
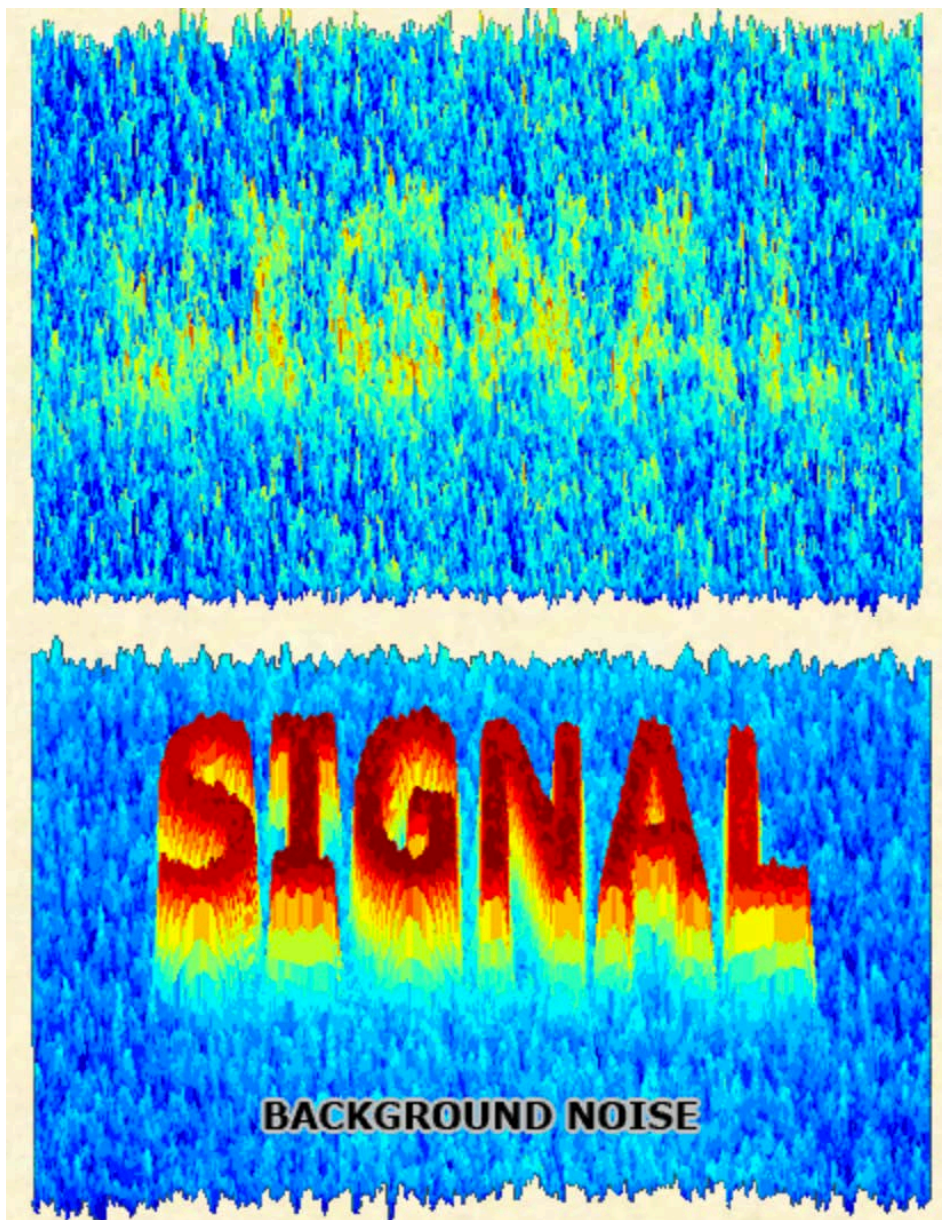




Regional Size Class Contributions

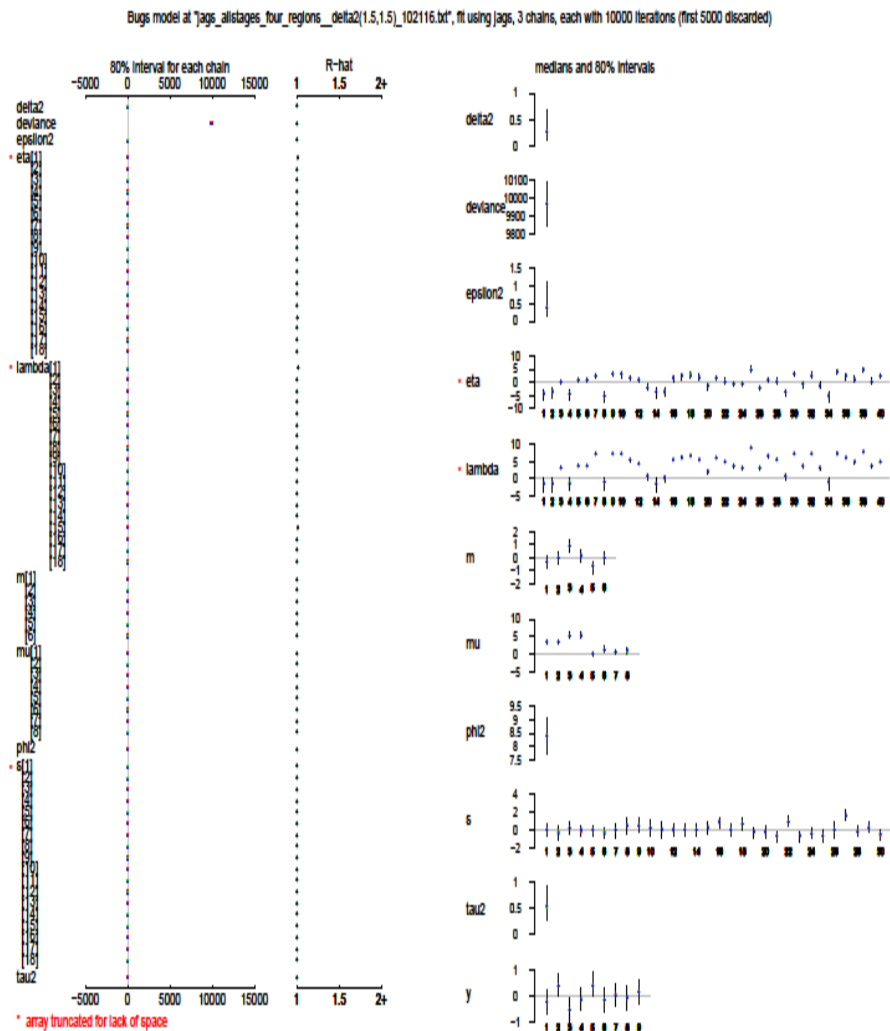


Separating Signal from Noise

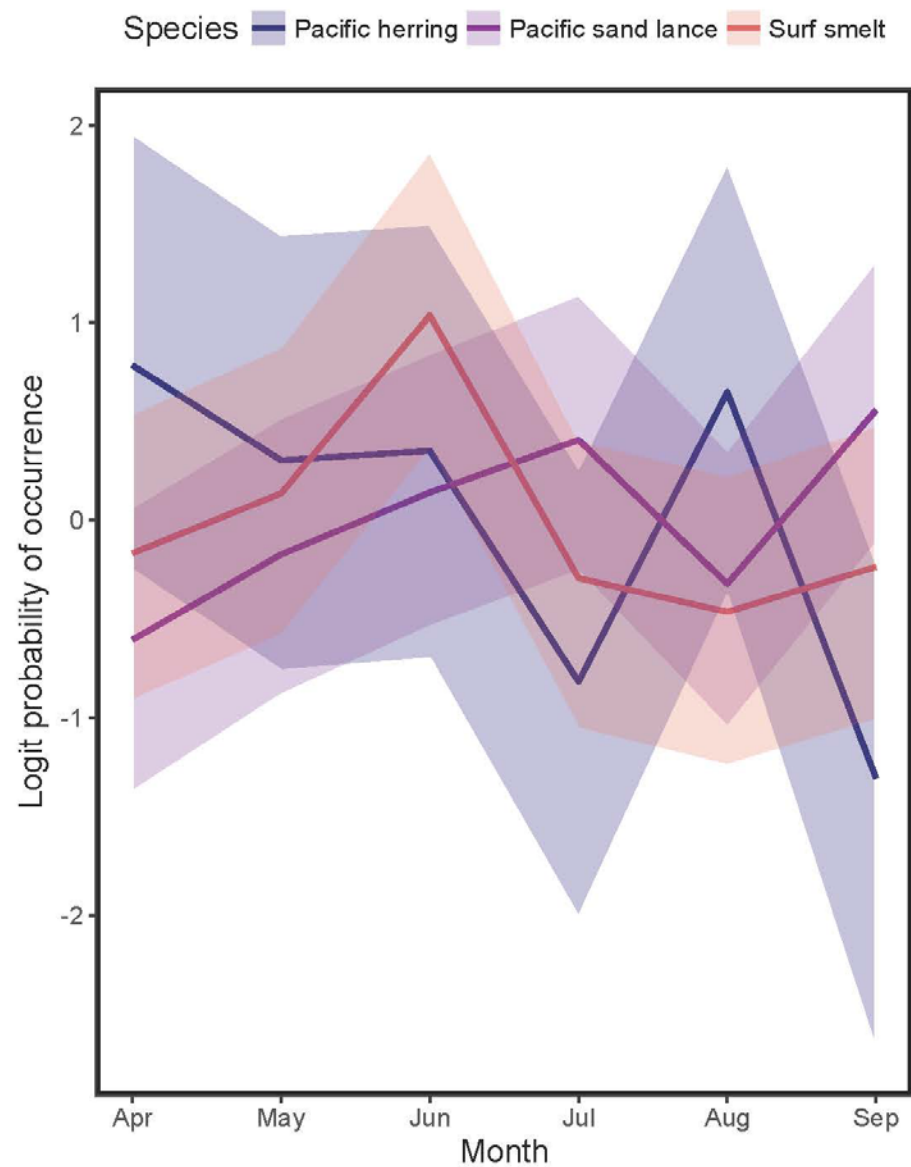
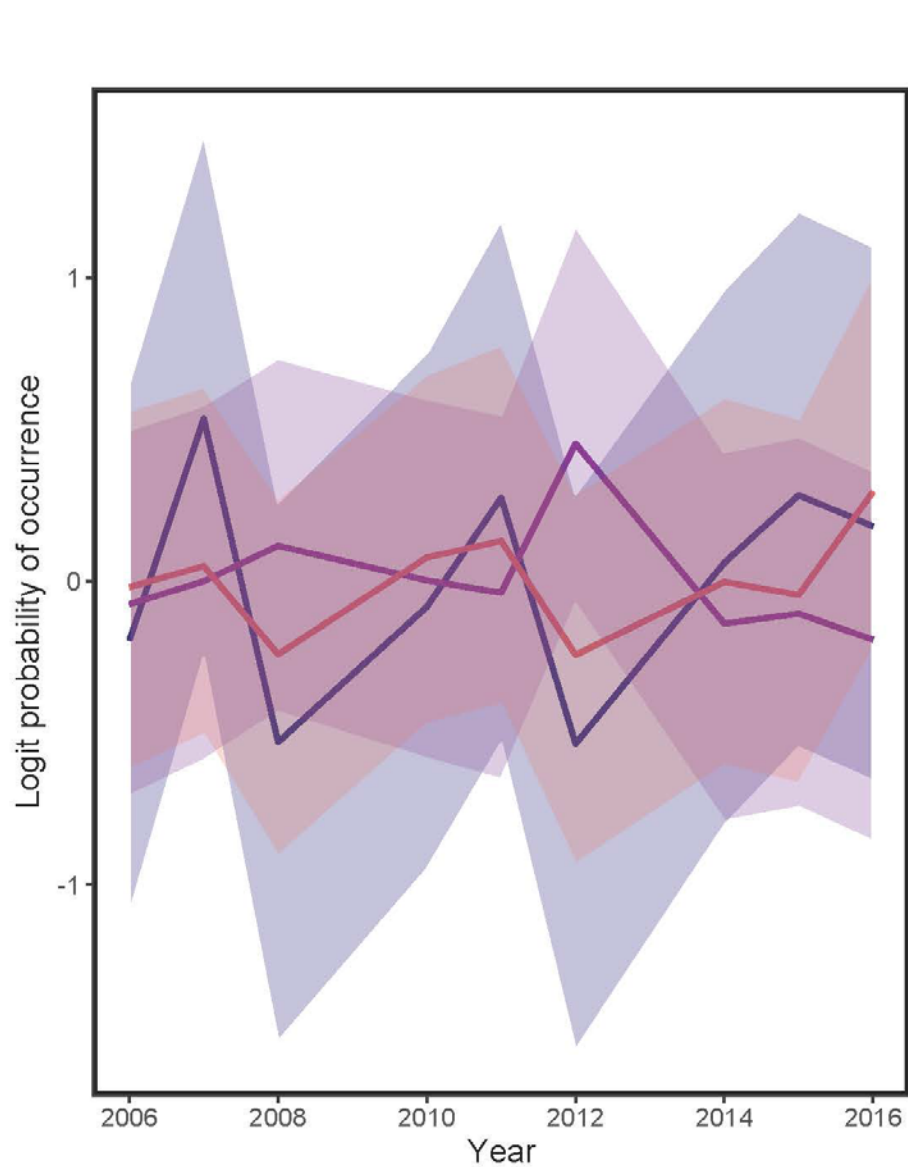


Build a Model

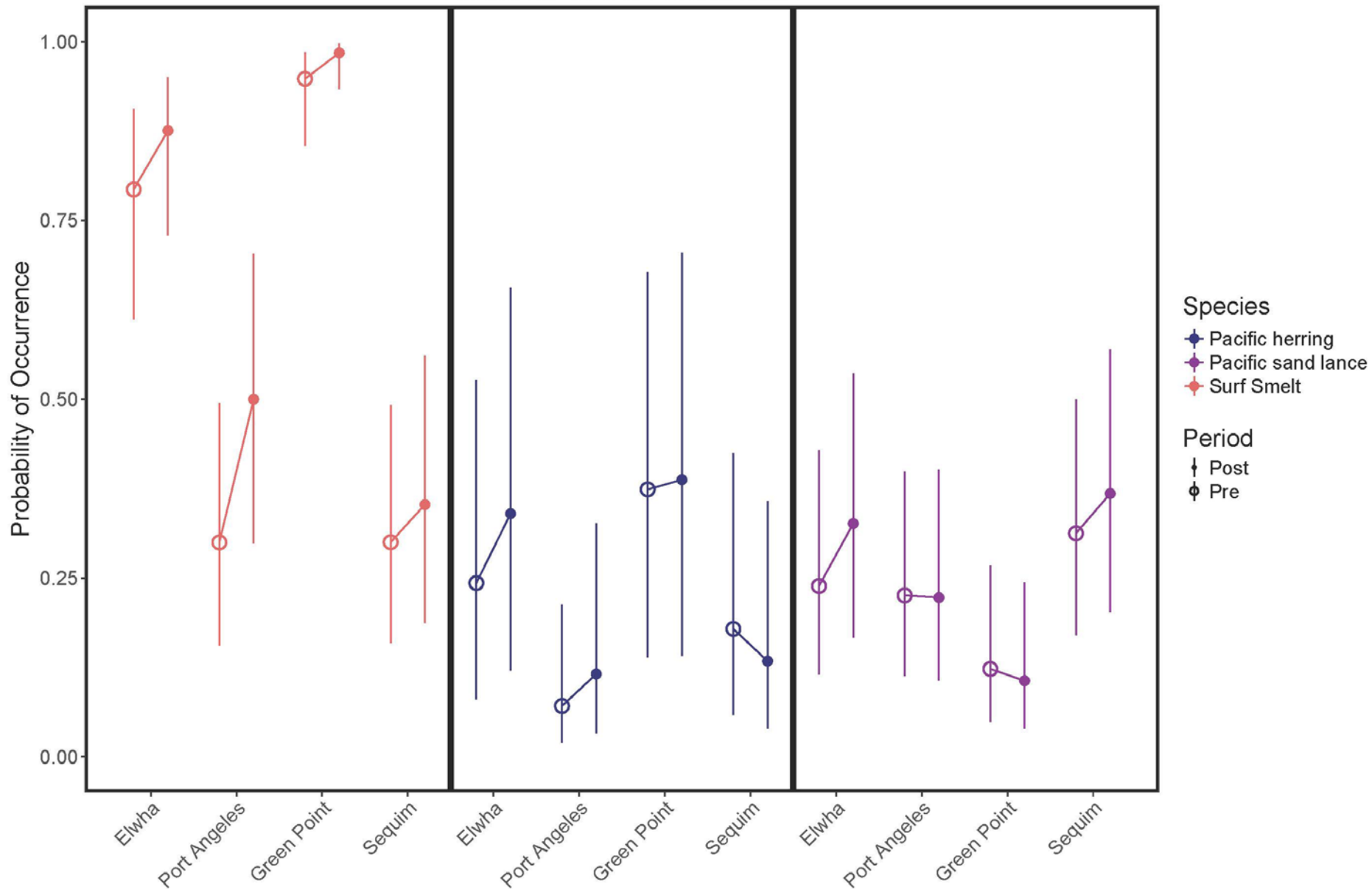
- Bayesian hierarchical modeling framework
 - Explore effects of temporal and spatial variability on forage fish abundance and community composition
 - Model includes: year, month, site, status relative to dam removal



Annual and seasonal variability in probability of occurrence



Predicted Occurrence Before and After Removal of the Elwha Dam



Results/Conclusions

- We catch a LOT of fish. Catch is highly variable.
 - 45-55 species/year, 23-93K individuals
 - Forage fish dominate: >82% of individuals caught
 - Big 3 species: Surf Smelt, Pacific Sand Lance, Pacific Herring
 - More prevalence of other FF species when these decline
- Following dam removal:
 - Surf smelt abundance increased, particularly adults, but surf smelt increased everywhere
 - Moderate increases in occurrence for other species in Elwha region only
 - sample-limited with this modeling approach

Next Steps

- Develop a model that will better accommodate missing/patchy data so we can analyze effects on more species.
 - Apply to salmonids using this model
- Incorporate environmental variables into more sophisticated model.
- Expand to explore forage fish populations in the Salish Sea. Collaborate with others to examine the relatedness of individuals caught in different places using:
 - Genetics
 - Stable isotope analyses

It takes an army.

Funded jointly through
NOAA and the Lower
Elwha Klallam Tribe.

